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Single qubit gate fidelity for neutral atom qubits in a 3D optical lattice YANG WANG, XIANLI ZHANG, Department of Physics, the Pennsylvania State University, University Park, PA 16802, THEODORE A. CORCOVILOS, Department of Physics, Duquesne University, Pittsburgh, PA 15282., DAVID S. WEISS, Department of Physics, the Pennsylvania State University, University Park, PA 16802 — We report on a quantum computing experiment using individual Cs atoms in a 5 μm-spaced 3D optical lattice. Single atoms in the 3D array are selected using two perpendicular far-off-resonance addressing beams. The AC Stark shift from these addressing beams shifts only the target atom into a microwave resonance, so that only the target atom participates in the gate. We will describe the gate operation, and present measurements of gate fidelity and cross talk. The measured coherence time of these qubits is 5.3 s.

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